

Serial No.: 10/568,803
Atty. Docket No.: P69083US1

REMARKS

The Office Action mailed February 1, 2007, has been carefully reviewed and, by this Amendment, Applicants have canceled claims 2, 3, 6 and 7, amended claims 1, 4, 8, 10, 16-18, 21, 26 and 28 and added claims 31-36. Claims 1, 4, 5 and 8-36 are pending in the application. Claims 1, 26 and 33 are independent.

The Examiner objected to the abstract as being too long. With this Amendment, Applicants have provided a new abstract and request that the same be entered.

The Examiner rejected claims 1-8, 10, 18, 22 and 25-30 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,181,860 to Granestrand et al. ("Granestrand"), and also rejected claims 1, 9, 10 and 25-30 as being anticipated by U.S. Patent No. 6,269,211 to Hatayama et al. ("Hatayama"). The Examiner further rejected claim 1 under 35 U.S.C. 102(e) as being anticipated by U.S. Publication No. 2003/0053756 to Lam et al. ("Lam"). Under 35 U.S.C. 103(a), the Examiner rejected claims 9, 11-17, 19-21, 23 and 24 as being unpatentable over Granestrand.

As set forth in claim 1, the present invention is directed to an optical component comprising a combination of optical waveguide elements for modifying the spot size of a mode

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of an electromagnetic field propagated by an optical waveguide element. The optical waveguide elements are formed on a substrate, with the optical component including a first section, having a first optical waveguide element configured to sustain at least one mode of the electromagnetic field, and a second section comprising at least two cooperating optical waveguide elements, each of the two cooperating optical waveguide elements having at least one waveguide segment, and the at least two cooperating optical waveguide elements being optically connected to the first optical waveguide element of the first section. The cooperating optical waveguide elements of the second section are adapted to maintain optical coupling between the optical waveguide elements to ensure that the at least one mode of the electromagnetic field is sustained by the at least two cooperating optical waveguide elements in cooperation.

As amended herein, claim 1 further provides that the waveguide of the first and second sections of the optical components are tapered to increase in width towards the interconnection between the first and second sections. Support for this amendment is found in previously pending claims 2 and 6, now canceled. In addition, amended claim 1 specifies that the tapering of at least one of the edges of the first optical

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waveguide element and at least one of the edges of the at least two cooperating optical waveguide elements in a direction substantially parallel to the direction of propagation of the electromagnetic field of the optical waveguide element in question are defined by a generating curve essentially following a trigonometric functional path (such as a cosine path), or an nth order polynomial path of at least 5th order (such as a 5th or a 7th order polynomial path). Support for this latter amendment is found in original claims 3 and 7, now canceled, and in the description on p. 25, lines 18-21 and on p. 37, lines 6-11. None of the prior art references teach that at least one of the edges of the first optical waveguide element and at least one of the edges of the at least two cooperating optical waveguide elements, as defined above, follow the path of a trigonometric functional path. Accordingly, amended claim 1, and new independent claim 33, are not anticipated by any of the cited references.

More particularly, Granestrand teaches that the specified edges may follow a linear curve (see Figures 1 and 3), and states that these edges are linear or parabolic, i.e., the waveguide of the 'widening' section, see col. 2, lines 66-67; or 'conical', i.e., the waveguides of the 'teethed' section, see col. 3, lines 6-10.

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Hatayama teaches two side core regions provided along the tip portion of the core region. As the side core regions are isolated from the core region of the central waveguide (see Figures 7A, 7B), the claimed subject of claims 1 and 33 is therefore not anticipated by Hatayama. Furthermore, nothing is taught about the form of the waveguides.

Finally, Lam teaches a spot size converter with a tapered upper waveguide and an untapered lower waveguide. Nothing is taught in Lam about the form of the waveguides as is set forth in claims 1 and 33.

In addition, claim 1 has been amended to include the positive structural limitation that the first optical waveguide element is *configured* (or structured) to sustain at least one mode of the electromagnetic field.

For at least the foregoing reasons, amended claim 1 and new claim 33 are not shown or suggested by the prior art and are in condition for allowance.

Similarly, method claim 26, which has been amended to be in independent form in compliance with U.S. practice and which includes the structure set forth in claim 1, is also in condition for allowance for at least the same reasons as claim 1. Further, the method of claim 26 defines patentable subject matter as being

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directed to a product by process that produces a structure that is patentable over the prior art.

Claims 4, 5, 8-25 and 27-30, as well as new claims 31, 32 and 34-36, are in condition for allowance as claims properly dependent on an allowable base claim and for the subject matter contained therein.

More particularly, the prior art does not teach or suggest an optical component in which the waveguide elements are formed on a substrate with a base layer formed on the substrate, a waveguide defining core pattern of a core material formed on the base layer and an upper cladding layer covering the core pattern and the base layer, as set forth in claim 31. Support for this claim is found in the description on p. 17, lines 9-12.

The prior art also fails to disclose the subject matter of claim 32 which defines that the core regions of the optical waveguide elements of the second section are implemented in the same physical layer and continue into the core region of the first optical waveguide element of the first section of the optical component. Support for this claim is found in the description on p. 8, lines 31-35.

New claims 34-36 set forth subject matter previously contained in claims 4, 8 and 28, respectively.

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With this amendment and the foregoing remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any questions or comments, the Examiner is cordially invited to telephone the undersigned attorney so that the present application can receive an early Notice of Allowance.

Respectfully submitted,

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